

REMARKS

Claims 1, 3-19, 22-27, and 30 are now pending in the application. Claims 1, 3-19, 22-27, and 30 stand rejected. Claims 2, 20, 21, 28, and 29 have been cancelled herein; and Claims 1, 5-7, 19, 22, 25-27, and 30 have been amended. Bases for the amendments can be found throughout the application, drawings and claims as originally filed and, as such, no new matter has been presented. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

CLAIM AMENDMENTS

The claims are presently amended to further clarify the presently pending claims for consideration and to correct minor informalities. Applicants submit that the present amendments to the claims clarify the various elements of the claims previously presented and are in line with the Applicants' previous arguments and amendments. Thus, the amendments to the claims herein do not require a new search.

REJECTION UNDER 35 U.S.C. § 103

Claims 1, 8-11, 13, 18-19, and 23-25 stand rejected under 35 U.S.C. § 103(a) as being anticipated by Chandley et al. (U.S. Pat. No. 5,161,604, hereinafter "Chandley"). Claims 2-4 and 20-22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Chandley in view of Hornung et al. (U.S. Pat. No. 4,749,549, hereinafter "Hornung"). Claims 5-7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Chandley in view of either Trager et al. (U.S. Pat. No. 4,867,227, hereinafter "Trager") or Craig et al. (U.S. Pat. No. 6,793,707, hereinafter "Craig"). Claims 12, 17,

26, and 30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Chandley in view of Fisher et al. (U.S. Pat. No. 5,033,531, hereinafter "Fisher"). Claims 14-16 and 27-29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Chandley in view of Daussan et al. (U.S. Pat. No. 6,540,005, hereinafter "Daussan"). As Claims 2, 20, 21, 28, and 29 have been cancelled, the rejections of these claims have been rendered moot. These rejections are respectfully traversed.

At the outset, Applicants note independent Claim 1 has been amended to recite:

at least one chamber located within the runner system and containing a metallurgical modifier selected for combination with **molten aluminum**, the metallurgical modifier selected from the group of antimony, beryllium, boron, calcium, fluxing salts, phosphorous, silver, sodium, strontium, titanium, titanium boron, vanadium and zirconium, or a combination thereof. (emphasis added)

In addition, Applicants note independent Claim 18 recites:

means for adjusting the chemistry of **molten aluminum** after the molten aluminum is introduced into the casting mold during a casting process. (emphasis added)

Further, Applicants note independent Claim 19 has been amended to recite:

introducing **molten aluminum** into the casting mold;

forming a **silicon-aluminum metal melt cast**;
and

providing a metallurgical modifier comprising strontium **in the form of stock material**. (emphasis added)

Applicants respectfully submits that neither Chandley, Hornung, Trager, Craig, Fisher nor Daussan teach or suggest Applicants' claims herein.

Initially, Applicants respectfully assert that the Chandley patent neither discloses aluminum casting nor relates to the field of aluminum casting with a metallurgical

modifier or modifying the chemistry of molten aluminum or any field reasonably pertinent to the resolution of the problem being solved by the present invention. The C.C.P.A. has explained the policy that the references be available to the inventor as follows:

In resolving the question of obviousness under 35 U.S.C. §103(a), we presume full knowledge by the inventor of all the prior art in the field of his endeavor. However, with regard to prior art outside the field of his endeavor, we only presume knowledge from those arts reasonably pertinent to the particular problem with which the inventor was involved. The rationale behind this rule precluding rejections based on combination of teachings of references from nonanalogous arts is the realization that an inventor could not possibly be aware of every teaching in every art. *In re Wood*, 599 F.2d 1032, 202 USPQ 171, 174 (C.C.P.A. 1979) (citing *In re Antle*, 444 F.2d 1168, 1171-72, 170 USPQ 285, 287-88 (C.C.P.A. 1971)).

The Federal Circuit has clarified how to determine whether a reference is reasonably pertinent to the particular problem with which the inventor was involved. The Federal Circuit has stated:

A reference is reasonably pertinent if ... it is one which, because of the matter with which it deals, logically would have commended itself to the inventor's attention in considering his problem. *In re Clay*, 966 F.2d 656, 22 USPQ 2d 1058, 1060-61 (Fed Cir. 1992).

Applicants submit that the matter with which the present application deals is aluminum casting and that one of ordinary skill in the art of casting aluminum would not have been logically commended to review casting iron to solve the problem to which the present application is directed (i.e., to cast aluminum with a metallurgical modifier). As iron has chemical and bonding properties that are significantly distinct from aluminum, one

skilled in the art of casting aluminum would not look to molding processes for casting iron.

In particular, iron is classified under Group VIII of the periodic table, while aluminum is classified in Group IIIA. Thus, one with skill in the art of casting aluminum, at best, would look to other elements in Group IIIA and not to elements classified in Group VIII. The distinctions in the chemical properties of aluminum and iron are clearly illustrated by the melting point of iron: iron has a melting point of 1535° Celsius, which is over twice the melting point of aluminum at 658.6° Celsius. Consequently, the Chandley reference is not analogous art and cannot be properly modified by the Examiner or cited as prior art. *Id.*, 966 F.2d at 658. Furthermore, as the crystal structures of these metals vary significantly with alloying elements and processing conditions, any suggestion to one skilled in the art to merely substitute one alloying material in another base metal would be misguided.

Even if the Chandley reference were to be characterized as analogous art, Applicants respectfully submit that the combination of references cited by the Office does not present a *prima facie* case of obviousness. The establishment of a *prima facie* case of obviousness requires that three basic criteria be met: 1) that there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings; 2) that there must be a reasonable expectation of success; and 3) that the prior art reference or references must teach or suggest all the claim limitations. See, e.g., *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Moreover, the teaching or suggestion to make the claimed combination and the

reasonable expectation of success must both be found in the prior art, and not based on Applicants' disclosure. *Id.*

First, there is no suggestion in Chandley whatsoever regarding the desirability of modifying Chandley for use in casting aluminum with a metallurgical modifier or any reasonable expectation of success if the teachings of Chandley were to be used with casting aluminum. The Examiner argues that the claims of Chandley are broad to encompass all types of materials; however, Chandley does not teach, suggest or disclose whatsoever casting aluminum or casting aluminum with a metallurgical modifier. Applicants submit it is improper for the Examiner to modify Chandley to incorporate casting aluminum without any express suggestion of the desirability to do so. In particular:

The mere fact that prior art may be modified in the manner suggested by the Examiner does not make the modification obvious **unless the prior art suggested the desirability of the modification.** *In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783-1784 (Fed. Cir. 1992) (citing *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir 1984)). (emphasis added)

Accordingly, as Chandley does not suggest the desirability of casting aluminum, Applicants respectfully assert the Examiner's modification is improper. Second, the Examiner has failed to show any reasonable expectation of success in modifying Chandley for casting aluminum; and Chandley does not teach whatsoever that one could be successful in using his process to cast aluminum. In addition, Applicants note that neither Hornung, Trager, Craig, Fisher nor Daussan teach or suggest whatsoever the desirability of using a method for casting iron with casting aluminum. Rather, each of these references deal with casting iron with the exception of Daussan, which deals

with the gate for pouring molten metal. Further, none of these cited references disclose any expectation of success in casting aluminum with a metallurgical modifier using a method for casting iron.

Furthermore, Applicants note that due to the different chemical properties of aluminum, if aluminum was used in the casting process of Chandley it would likely create components which would have chemical properties distinctly different than that originally contemplated by Chandley. In particular, Chandley discloses the use of a magnesium based alloyant (Column 5, lines 4-7) to nodularize or spherodize the carbon in the melt (see at least Column 5, lines 5-12). Thus, modifying Chandley to include aluminum casting would render the method of Chandley unsatisfactory for its intended purpose and is improper, as nodularized or spherodized carbon are structures formed in iron/carbon alloys, not aluminum alloys.

Specifically, if proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900,221 USPQ 1125 (Fed. Cir. 1984) MPEP 2143.01. Additionally, if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (C.C.P.A. 1959) MPEP 2143.01.

As modifying Chandley for aluminum casting would render the method of operation of Chandley unsatisfactory (i.e., magnesium would not nodularize the carbon in aluminum, as aluminum is not carbon based), the Examiner's modification of

Chandley to teach aluminum casting is improper. With particular reference to Applicants' Claim 19, Applicants further note that neither Chandley nor any of the cited references disclose forming an aluminum-silicon melt or using bar stock strontium as a metallurgical modifier with aluminum. As discussed above, Chandley does not disclose whatsoever casting aluminum. Further, Chandley teaches the desirability of enabling the molten iron to contact a magnesium based alloyant 20 stuccoed to a wall 14c to enable "high alloyant surface area for contact with the melt" (see at least Column 4, lines 50-60). Modifying Chandley to use a bar stock metallurgical modifier would improperly modify the method of operation of Chandley, as bar stock does not provide a high alloyant surface area for contact with the molten material.

Accordingly, in view of the above discussion, Applicants respectfully assert the Examiner has not presented a *prima facie* case of obviousness and as such, Applicants respectfully request the Examiner to reconsider and withdraw the rejection of Claims 1, 18 and 19 under 35 U.S.C. § 103(a).

With regard to Claims 3-17, 22-27 and 30, Applicants note these claims depend directly or indirectly from either independent Claim 1 or 19, and, thus, should be in condition for allowance for the reasons set forth for Claims 1 and 19 above. Accordingly, Applicants respectfully requests the Examiner reconsider and withdraw the rejections of Claims 3-17, 22-27 and 30 under 35 U.S.C. § 103(a).

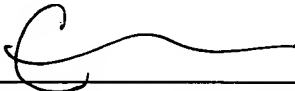
CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections. It is

believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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